

**INITIAL STATEMENT OF REASONS  
FOR  
PROPOSED BUILDING STANDARDS  
OF THE OFFICE OF THE STATE FIRE MARSHALL (SFM)**

**REGARDING PROPOSED AMENDMENTS FOR  
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 9**

The Administrative Procedure Act requires that an Initial Statement of Reasons be available to the public upon request when rulemaking action is being undertaken. The following are the reasons for proposing this particular rulemaking action:

ADOPTIONS, AMENDMENTS OR REPEALS:

SPECIFIC PURPOSE

The State Fire Marshal proposes to amend Title 24, California Fire Code regarding the service of fixed extinguishing systems protecting commercial cooking equipment adding language to require the replacement of non UL-300 compliant systems by 1-1-06. Other changes are being proposed, to remove references to systems no longer in use or accepted, to provide consistency in terminology.

NECESSITY

Changes in the cooking medium and appliance efficiency in modern restaurants have significantly altered the fire hazard in cooking areas. This necessitated a change in the UL testing standards for fixed extinguishing systems in 1994. Although it has been almost 10 years since the issuance of the new standard many existing locations are still protected by non-compliant systems even though they are using the newer cooking mediums and high efficiency appliances. This represents a risk of loss of property and personal injury as these non-compliant systems have been shown to lack effectiveness in extinguishing fires under modern conditions. Current code and manufacturer's requirements call for a semi-annual service/maintenance of all restaurant fire suppression systems. The State Fire Marshal has determined that it is not in the public interest to continue to service and certify fire suppression systems that do not meet the requirements of UL300.

The State Fire Marshal has determined that this regulatory action will produce a significant public and private benefit by reducing the risk of property loss and or personal injury to the owners of the commercial cooking equipment, the public, and surrounding businesses. It should also reduce the cost of fighting fires at restaurants not properly protected.

AUTHORITY

Section 13195 of the Health and Safety Code gives the State Fire Marshal authority to adopt, amend and repeal regulations for automatic fire extinguishing systems:

**13195.** The State Fire Marshal shall adopt and administer the regulations and building standards he or she deems necessary in order to (1) establish and control a program for servicing, testing, and maintaining all automatic fire extinguishing systems, including but not limited to, fire sprinkler systems, engineered and preengineered fixed extinguishing systems, standpipe systems, and water flow alarm devices and (2) establish minimum frequencies of service, inspection, and testing for the various types of automatic fire extinguishing systems. All tests of automatic sprinkler systems shall include a test of all supervisory signaling equipment that is provided to determine whether a condition exists that will impair the satisfactory operation of the system.

The regulations and building standards established by the State Fire Marshal for servicing, testing, and maintaining automatic fire extinguishing systems shall consider the requirements of the applicable standards of the National Fire Protection Association and the voluntary standards published by the State Fire Marshal entitled the "California Voluntary Standards for Residential Sprinkler Systems," dated January 1982.

Section 13198.5 of the Health and Safety code provides the legislative intent for fixed fire extinguishing systems:

13198.5. It is the legislative intention in enacting this chapter that the provisions of this chapter and the regulations and building standards adopted by the State Fire Marshal pursuant to Section 13195 shall apply uniformly throughout the State of California, and no state agency, county, city and county, or district shall adopt or enforce any ordinance or rule or regulation regarding automatic fire extinguishing systems which is inconsistent with the provisions of this chapter or the regulations and standards adopted by the State Fire Marshal.

#### TECHNICAL, THEORETICAL, AND/OR EMPIRICAL STUDY, REPORTS, OR DOCUMENTS

In proposing the adoption of this regulation the State Fire Marshal has relied on reports and documents provided by NFPA, Underwriters Laboratories, jurisdictions in other states, manufacturer's of fixed chemical systems, insurance companies, and equipment distributors.

#### **NFPA STUDY**

According to the NFPA report titled, " The U.S. Fire Problem Overview Report Leading Causes and Other Patterns and Trends in Eating and Drinking Establishments" dated June, 2001 cooking was the leading cause of fires in these structures beginning in the kitchen 50.8% of the time.

The report covers the period from 1994-1998 and reflects only fires that are reported to public fire departments. Of these reported fires, 58.5% of the fires were attributed to the cooking equipment.

Fires that began in deep fat fryers ranked first in dollar loss among cooking equipment fires. The annual total dollar loss attributed to eating and drinking establishment fires was \$163.2 million and of that figure \$ 11.4 million was from deep fat fryers.

Although fatal fires in these properties are relatively rare, the potential life safety hazard is high because of a possibly crowded establishment. No deaths were reported in these establishments when these systems were present. “

“The average estimated direct property damage was three times as high when no automatic suppression system was present.

Average loss per fire when automatic suppression systems were present was \$ 6,533 compared to the loss of \$ 18,845 with no automatic system was installed. That represents a reduction in loss of 65% with an automatic suppression system in place.

## **UNDERWRITERS LABORATORIES**

In its “UL300 Standard Update” published in 1997 by the National Association of Fire Equipment Distributors the organization provides the following background relative to the new testing standard.

“On November 21, 1994 a new Underwriters laboratories test standard entitled UL300, Fire Testing of Fire Extinguishing Systems for the Protection of Restaurant Cooking Areas went into effect. This new standard is the result of changes in fire hazards involving commercial cooking equipment.

Pre-engineered chemical suppression systems were developed in the 1960's for the protection of commercial cooking equipment, plenums and ducts. Underwriter's Laboratories (UL) developed a series of fire tests for these systems designed to duplicate the potential fire hazard found in the work place. These tests established specific requirements (and limitations) affecting extinguishing agent, fire detection, piping limitations, nozzle coverage, etc., for each manufacturer who submitted its system for UL testing. Following successful completion of such tests, this data created the installation and maintenance manual for that specific manufacturer.

At the time these tests were developed, rendered animal fat (lard) was typically used in commercial kitchens to fry various foods. Commercial cooking operations, appliances and supplies have changed greatly since the 1960's. Health concerns have reduced the use of lard. Efforts to cook faster have caused the use of insulated 'high efficiency' fryers that heat faster and cool slower. In this same 1997 document NAFED states “Restaurant suppliers estimate that 70-75% of commercial kitchens use vegetable oils for frying in high-efficiency fryers.”

These changes have significantly altered the fire hazard in cooking areas. Lard has a large percentage of saturated fat whereas vegetable oils have a low percentage of fatty acids. The auto-ignition temperature of most animal fats is in the 550-600 degree F. range compared to the auto-ignition temperature of most vegetable oils which is at 685 degree F. and higher.

The extinguishing agent employed in pre-engineered restaurant systems is an alkaline base. Fatty acids combine with alkalines to produce a soapy solution in process known

as saponification. Thus when a suppression system is discharged on a burning deep fat fryer containing rendered animal fat, a soap blanket is formed cutting off the oxygen supply and containing the fire until the fuel is cooled below its auto-ignition temperature.

A similar fire involving vegetable oils creates a different set of circumstances. With only a limited amount of fatty acids saponification is greatly reduced and the higher temperatures of such fires, enhanced by the insulation in a high-efficiency fryer, cause the soap blanket to break down. Thus the extinguishing capability of the fire suppression system is reduced.

UL recognized the need for a new set of standards for pre-engineered systems and developed its new UL300 standard. As might be anticipated many changes were made in the testing program.

Another NAFED article makes the statement that “testing by some fire equipment manufacturers showed that while dry chemical systems could knock down the UL300 test fires, the fires would reflash and continue to burn due to lack of cooling. No listings, to date, have been obtained for dry chemical systems tested to the UL300 standard.”

This same article further states that “waterspray devices are not presently tested according to the new UL300 standard. However, testing by the Fire Equipment Manufacturer’s Association (FEMA) showed that water spray devices took more than six and one-half minutes to extinguish test fires, versus three seconds for wet chemical suppression systems.”

A chart comparing former tests with the new requirements is printed below.

<u>Description</u>	<u>Pre UL300 Requirement</u>	<u>UL300 Requirement</u>
Equipment Used in Tests	Could be mock up appliances without the same insulation as commercial units and with no specified heat up rates	Must be actual commercially used equipment that more realistically mirrored restaurant conditions
Heat Up Rates	None	Must heat up at a minimum of 12 deg per minute
Cool Down Rates	None – Cooled down rapidly due to lack of insulation	Must cool down at a maximum of 5 deg per minute
Medium Auto Ignition Temp	650 degrees	685 degrees
Pre Burn Requirements prior to System Actuation	1 Minute with fuel source shutting down immediately on ignition	2 minutes with fuel source remaining on until system actuation as in a real fire situation
Splash Requirements	None	Must prevent splashing of hot cooking oils during actuation
Securement Time	Chemical must secure fire for a period of 5 minutes w/o re-ignition –Easier to accomplish this with rapid cool down and lower auto ignition temperatures	Chemical must secure fire for 20 minutes

As some confusion seemed to exist in regards to the current UL listing of non UL300 compliant systems for which parts could no longer be obtained, The Fire Equipment Manufacturer's Association (FEMA) requested clarification from Underwriters Laboratories and received the following response:

1. "To maintain its UL Listing, an extinguishing system unit is to be installed, serviced and maintained in accordance with NFPA 17/17A and NFPA 96, the instructions on the nameplate, and the manual referenced on the nameplate."
2. "The use of any parts or agent not specifically identified in the manufacturer's manual, or the use of parts not specifically UL Classified for the intended use in the servicing of the systems unit, does not maintain the UL Listing for that extinguishing system unit and therefore, would not be considered UL Listed."
3. "When the appropriate service parts or agent for recharging are no longer available for a specific model UL Listed extinguishing system unit, the Listing for that system unit cannot be maintained in accordance with the manufacturer's manual, NFPA 17/17A and NFPA 96, and therefore, would not be considered UL Listed."

It would seem apparent that many systems currently installed may no longer have valid UL listings at all, since there are no longer appropriate service parts and/or agent available.

## **MANUFACTURERS**

Since the effective date of the UL300 standard numerous manufacturers have issued memos or bulletins defining their position in regards to pre UL300 systems.

**Kidde Fire Systems** issued Bulletin #02-09K in February of 2002 which states "Kidde Fire Systems will no longer support the installation, inspection service, recharge or repair of dry chemical systems protecting kitchen appliances and ventilation. When encountering a dry chemical system protecting kitchen appliances and ventilation, the only acceptable action is to upgrade to a UL300 wet chemical system." In May of 2003 Kidde issued another Bulletin #03-29K regarding non UL300 compliant wet chemical systems. This Bulletin states: "As you know, the pre-UL300 Aqua Blue system (WHDR250 and WHDR-500) has not been supported for over two years. All spare parts and cylinders specific to that system were discontinued and removed from the price sheets. If you encounter a pre-UL300 Aqua Blue system it should be upgraded to a UL300 APC system."

**Ansul** issued General Bulletin No. 4013 on March 16, 1998 which states "We at Ansul agree that liquid agent systems offer the best protection over commercial cooking hazards. Therefore, we began our formal withdrawal from the dry chemical systems business by discontinuing the sale of new dry chemical systems effective in February of 1995..... Effective January 1, 1999 Ansul will no longer sell service parts or support the sale or servicing of R-101 Dry Chemical Restaurant Fire Suppression Systems." In General Bulletin No. 4098 issued January 8, 1999 Ansul states "UL has grandfathered existing R-101 systems as long as the appliances and the hood(s) under which they are located do not change. If new, high-efficiency fryers are added, or if the arrangement of

the appliances changes enough to require redesign or realignment of the fire system, the dry chemical system must be replaced with a wet chemical system which meets UL300 standards. A change from animal-based to vegetable-based shortenings will also necessitate such a change.”

Effective January 1996 **Pyro-Chem** no longer offered components to support the “PC” series dry chemical restaurant systems. In language very similar to Ansul’s they state “when appliance changes are made to currently installed dry chemical systems or if new, high-efficiency fryers are added to the system lineup, we can not properly protect these additional or changed appliances. The system must be upgraded to a wet system that has been tested to UL300 standards. A change from animal based to vegetable based shortening will also require system upgrade to UL300.”

In a letter dated September 26, 1997 **Badger Fire Protection** issued information to its distributors on the upgrading of pre-UL300 Range Guard wet chemical systems to meet the new testing criteria.

There are also several manufacturers of dry chemical systems who are no longer producing pre-engineered systems of any kind and provide no support to any products that they had previously offered.

## **OTHER JURISDICTIONS**

Throughout the United States and Canada many jurisdictions are taking actions related to UL300 compliance. Some of these are outlined below.

The State of Wyoming issued a directive under the Uniform Fire Code requiring kitchen hood and duct suppression systems to comply with UL-300 by January 1, 2002. In May of 2002 the Connecticut Department of Public Safety “Update” references various Bulletins and memos received by the OSFM from UL, FEMA, Ansul and Kidde which identify systems that do not meet UL300 standards and “should be removed from service.” Recently the State of Utah Fire Prevention Board enacted Administrative Rules that require all existing dry chemical hood fire protection systems and all non UL300 wet chemical hood fire protection systems to be removed and upgraded by January 1, 2006. The state of Louisiana in its Interpretive Policy Memorandum 2001-4 of the State Fire Marshal, Dept. of Public Safety and Corrections has outlined the specific situations which require the removal and replacement of dry chemical fire suppression systems.

In other areas where the State has not taken action various city jurisdictions are acting individually. In June of 2001 the City of Seattle issued Bulletin #2000-2 which states that “Cooking operations requiring fire protection and using vegetable based oils in deep fat fryers must replace or convert their range hood systems to utilize the new type of extinguishing agent by January 2003.” The city of Eugene, OR has posted on its website the following language: “Pre-UL300 systems may continue without modification if kitchen equipment owners are not using vegetable oil for frying and the manufacturer listings are maintained.” The City of Redmond, Washington has issued Administrative Ruling/Interpretation UFC 1006.2.2 which states “Protection of Commercial Cooking Operations – Type of System: A UL300 system shall be required for all new installations of fire extinguishing systems that protect cooking equipment that have the potential to release grease laden vapors. Existing extinguishing systems protecting cooking equipment that do not comply with UL300 shall be brought into compliance with the standard within 6 months of notification by the Fire Prevention personnel.” In Bellevue,

WA all systems are required to be upgraded to UL300 and owners are given one year to comply. There are several cities in California that are currently considering action on this issue as local jurisdictions. We question whether this is the best approach to the problem considering the inconsistencies that may result.

In British Columbia the Office of the Fire Commissioner issued an Interpretation Bulletin in March of 1998 requiring existing fire extinguishing systems for commercial cooking equipment be upgraded by December 31, 2000.

## **INSURANCE COMPANIES**

The insurance industry is very concerned about the possibility of losses in restaurants protected by non UL-300 compliant systems. Safeco Insurance states that "A UL300 compliant fixed system is significantly more effective in controlling kitchen fires than systems designed to meet previous standards. Dry chemical systems and those systems that do not meet UL300 standards may not provide effective fire control. The introduction of new more modern cooking equipment, changes in cooking media and changes in cooking methodology require that more effective FFP systems be put into place. It is the recommendation of Safeco Risk Services that a competent and licensed contractor be retained to replace the existing FFP system with a system that is UL300 compliant." EMC Insurance Companies in its summer 2003 Loss Control Insights Newsletter has an article which begins "Is your commercial kitchen properly protected? Nearly a decade after UL issued test standard UL300, many commercial kitchens have still to retrofit their suppression systems to meet the new fire suppression demands of deep frying with vegetable oils. The decreased use of animal fats and the increased use of vegetable oils have made many restaurant fire extinguishing systems inadequate". Allied Insurance has recently begun requiring their insured's to have UL300 compliant systems before underwriting can be completed. In addition many insurance companies include questions relating to UL300 compliant systems on their Business Survey Forms. It is apparent that a business without UL300 compliant protection could be subjected to a higher cost for insurance.

## **SUMMARY**

The SFM has the statutory authority to provide regulation in this area and has determined based upon the evidence collected that a need for such regulation is apparent. Failure to provide such regulation can only result in industries and local jurisdictions attempting to provide the direction that should come from this office. The result will be inconsistency in language, application and enforcement.

## **REASONABLE ALTERNATIVES TO THE REGULATION AND THE AGENCY'S REASON FOR REJECTING THOSE ALTERNATIVES**

Staff has thoroughly reviewed this proposed regulatory action, including both the positive and negative impacts it will place upon various industries in California such as insurance, restaurants, fire protection, and others and most importantly on public safety. The following alternatives were considered and rejected for the reasons noted below.

- Allow the Fire Protection Industry to enforce compliance by refusing to certify non-compliant systems.

This alternative was rejected for several reasons. This industry has not proven to be very cohesive or capable of self-policing in the past. Many companies will likely continue to service non-compliant systems. Fire Inspectors are generally unable to determine whether systems meet UL300 compliance and rely primarily on the certification of the servicing company. This would be unfair to those companies who do enforce compliance and would result in an inconsistent application throughout the State. In addition, Fire Protection Companies are not necessarily conversant regarding various styles of cooking appliance and types of cooking mediums. This alternative does not serve the public interest.

- Allow local jurisdictions to set compliance requirements for their respective areas

This alternative was rejected as it will create inconsistencies in the regulations from one jurisdiction to the next. It was felt that the public interest would be best served by consistency in the regulations affecting these systems throughout the State of California. In addition the SFM has statutory authority to provide regulation in this area (Health & Safety Code Sections 13195-13199)

- Take no action & continue to allow pre-UL300 compliant systems to remain in place.

This alternative was rejected out of an interest in public safety and minimization of property loss. The standards have been in place for ten years and there has been ample time provided for restaurants to upgrade their existing systems. There remain a significant number of restaurants who have not yet converted to the new systems and who are using equipment and cooking media that should have already forced them to make a change. Since the Fire Service is not trained in recognizing these situations inspections have proven to be an ineffective way of enforcing compliance.

#### REASONABLE ALTERNATIVES TO THE PROPOSED REGULATORY ACTION THAT WOULD LESSEN THE ADVERSE IMPACT ON SMALL BUSINESS

The State Fire Marshal considered requiring compliance by January 1, 2005. It was felt that changing the compliance date to January 1, 2006 would lessen any possible adverse impact on small business. It should be understood however, that adverse impact is expected to be minimal or non-existent since the benefits outweigh the costs.

#### EVIDENCE SUPPORTING FINDING OF NO SIGNIFICANT ADVERSE IMPACT ON ANY BUSINESS

No significant adverse economic impact.

#### DUPLICATION OR CONFLICTS WITH FEDERAL REGULATIONS

There are no Federal Regulations that duplicate or conflict with the proposed changes.



**EXPRESS TERMS  
OF PROPOSED BUILDING STANDARDS  
OF THE  
STATE FIRE MARSHAL (SFM)**

**REGARDING THE PROPOSED AMENDMENTS TO  
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 9**

**SECTION 1005--- PROTECTION OF COMMERCIAL COOKING OPERATIONS**

**1005.1 Ventilating Hood and Duct Systems.** A ventilating hood and duct system shall be provided in accordance with the Mechanical Code for commercial-type food and heat-processing equipment that produces grease-laden vapors.

**1005.2 Fire-extinguishing Systems.**

**1005.2.1 Where required.** Approved automatic fire-extinguishing systems shall be provided for the protection of commercial-type cooking equipment.

**Exception:** The requirement for protection does not include steam kettles and steam tables or equipment, which as used, does not create grease-laden vapors.

**1005.2.2 Type of system.** Protection of new commercial-type cooking equipment shall be by means of an automatic fire-extinguishing system complying with UL 300 that is listed and labeled for its intended use.

**All existing systems designed for the protection of commercial cooking equipment shall be made to comply with UL 300 or replaced by the first required service date after January 1, 2006.**

Systems shall be installed in accordance with the Mechanical Code, their listing and the manufacturer's instructions. ~~Other systems shall be of an approved design and shall be of the following types:~~

- ~~1. Automatic sprinkler system.~~
- ~~2. Dry chemical extinguishing system.~~
- ~~3. Carbon dioxide extinguishing system.~~
- ~~4. Wet chemical extinguishing system.~~

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### **1005.2.3 Extent of protection.**

**1005.2.3.1 General.** The automatic fire-extinguishing system used to protect the ventilation hoods and ducts and cooking appliances shall be installed to include cooking surfaces, deep-fat fryers, griddles, upright broilers, char-broilers, range tops, and grills **and any other equipment having the potential to develop grease-laden vapors.**

Protection shall also be provided for the enclosed plenum space within the hood above filters and exhaust ducts serving the hood.

~~**1005.2.3.2 Carbon dioxide systems.** When carbon dioxide systems are used, there shall be a nozzle at the top of the ventilation duct. Additional nozzles that are symmetrically arranged to give uniform distribution shall be installed within vertical ducts exceeding 20 feet (6096 mm) and horizontal ducts exceeding 50 feet (15240 mm). Dampers shall be installed at either the top or the bottom of the duct and shall be arranged to operate automatically upon activation of the extinguishing system. When the damper is installed at the top of the duct, the nozzle shall be immediately below the damper. Carbon dioxide automatic fire-extinguishing systems shall be sufficiently sized to protect all hazards venting through a common duct simultaneously.~~

### **1005.2.4 Automatic power, and fuel and ventilation shutoff.**

**1005.2.4.1 General.** Automatic fire-extinguishing systems shall be interconnected to the fuel **and power** supply for the cooking equipment. The interconnection shall be arranged to automatically shut off all cooking equipment and electrical receptacles, which are located under the hood, when the system is actuated.

Shutoff valves or switches shall be of a type that requires a manual operation to reset.

~~**1005.2.4.2 Carbon dioxide systems.** Commercial type cooking equipment protected by an automatic carbon dioxide extinguishing system shall be arranged to shut off the ventilation system upon activation.~~

~~**1005.2.5 Special provision for automatic sprinkler systems.** Commercial type cooking equipment protected by automatic sprinkler systems shall be supplied from a separate, readily accessible indicating type valve that is identified.~~

~~Sprinklers used for the protection of fryers shall be listed for that application and installed in accordance with their listing.~~

~~**1005.2.6**~~ **1005.2.5 Manual system operation.** A readily accessible manual activation device installed at an approved location shall be provided for dry chemical, wet chemical and carbon dioxide systems. The activation device is allowed to be mechanically or electrically operated. If the electrical power is used, the system shall be connected to a standby power system and a visual means shall be provided to show that the extinguishing system is energized. Instruction for operating the fire-extinguishing system shall be posted adjacent to manual activation devices.

**~~1005.2.8~~ 1005.2.7 Operations and maintenance.** The ventilation system in connection with hoods shall be operated at the required rate of air movement, and classified grease filters shall be in place when equipment under a kitchen grease hood is in use.

If grease extractors are installed, they shall be operated when the commercial-type cooking equipment is used.

Hoods, grease-removal devices, fans, ducts and other appurtenances shall be cleaned at intervals necessary to prevent the accumulation of grease. Cleanings shall be recorded, and records shall state the extent, time and date of cleaning. Such records shall be maintained on the premises.

Extinguishing systems shall be serviced at least every six months or after activation of the system. Inspection shall be by qualified individuals, and a Certificate of Inspection shall be forwarded to the ~~chief~~ **authority having jurisdiction (AHJ)** upon completion.

Fusible links ~~and automatic sprinkler heads~~ shall be replaced at least annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

Exception: Frangible bulbs need not be replaced annually.

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